Gal 72d

AN ESSAY ON INOCULATION FOR THE SMALL POX.

Wherein the NATURE of the DISEASE is explained, the various Methods of Preparation that have been practiſed in America are critically examined, and that which the Author has found, from his own Experience, to be moſt ſucceſsful, is clearly laid down.

WITH

An APPENDIX,

CONTAINING

A Chymical Examination of Mr. SUTTON's Medicines.

By THOMAS RUSTON, M. D.

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> Ratiocinium plurimum laudo, quod ex effectibus initium ſumit, et conſequentias ex Phænomenis proſequitur.
>
> HIPPOC. PRÆCEPTA.

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MVSEVM
BRITAN
NICVM

PREFACE.

FROM the variety of publications that have already appeared, it may ſeem, to ſome, unneceſſary, to ſay more upon this ſubject; but, though a great deal has been ſaid, there was ſtill a great deal more wanting, as muſt evidently appear to any one who gives himſelf the trouble to enquire into this matter.

The authors of the chief performances that have been written of late, all except one, wherein we have an account of the author's own method of practice, have profeſſed no more, than to attempt to find out a method, which has, hitherto, with great care, been kept as a ſecret; and ſuch a curioſity was ſufficiently juſtifiable, from the amaſing ſucceſs that has attended that practice.

But if attempts of that ſort merit applauſe, I flatter myſelf that I ſhall be excuſed, when I preſume to offer to the public a method, which I am well aſſured, from its ſucceſs, is fully equal to it, and which has been the ſubject of my own experience ; more eſpecially ſince I have been able, by an accurate chymical examination to find out the properties and compoſitions of thoſe medicines, which have, hitherto, been only gueſſed at by thoſe diligent enquirers.

To many, unacquainted with medical erudition, I am perſuaded a great part of this performance will appear rather too philoſophical ; but when reaſoning is introduced from true induction, and a ſtrict attention is paid to ſuch facts as tend either to ſupport or controvert an opinion, theory is not only ſafe, but neceſſary to conduct the human mind in her future enquiries.

AN
ESSAY
ON
INOCULATION.

THE method of preparing in inoculating for the ſmall-pox, of which I propoſe to ſpeak in the following treatiſe, was firſt practiſed in America, about the year 1745, which was long before it was made uſe of in any part of Europe. It is ſomewhat uncertain, who firſt gave the hint of it, though it would be well worth our while to know, to whom we are ſo much indebted for this diſcovery; for gratitude to the author of one, ſo uſeful to mankind, ought to be engraven on our hearts, and his name ſhould be moſt reſpectfully held in perpetual remembrance. To Dr. Muriſon, however, of Long Iſland, and Dr. Thomas of Virginia, we lie principally under obligations, for firſt making the public experience the benefit of it.

But, I think, it is moſt probable that the hint was taken from the learned Boerhaave, who died in 1738; for though he never practiſed it himſelf, nor ſeems to underſtand the manner in which theſe medicines operate to produce their ſalutary effects; yet, in his chapter of Aphoriſms *de Variolis*, he ſays, that he imagines a ſpecific might be found, amongſt the claſs of *antidotes*, to correct and deſtroy the *variolous virus*; and he adds, that "*In* "*ſtibio et mercurio, ad magnam penetrabili-* "*tatem arte deductis, nec tamen ſalina acri-* "*monia nimium corroſivis, ſed bene unitis,* "*ut quæramus, incitat aliquis horum ali-* "*quando ſucceſſus**. But, though they might have had this hint from him, yet chance here, as in moſt other uſeful diſcoveries, ſeems principally to have directed our

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* Sect. 1392.

Americans; for it would have required more knowledge in chymiſtry than they were maſters of, to compound theſe medicines, by reaſonings deduced *a priore*, ſo as to have their full force; and it was only the amazing ſucceſs which attended the exhibiting of them, that recommended their method to the public.

The inventors firſt practiſed upon thoſe in their own neighbourhood; but the fame of their ſucceſs ſoon extending itſelf, they had patients in crowds flocking in upon them from all hands; and the happy event proving the ſame in ſo many numberleſs inſtances, none, at laſt, would be inoculated but according to this method. Every practitioner, in ſhort, was obliged to acknowlege the ſuperior advantages attending it, and very conſiderable premiums were offered for the ſecret.

But here too, as uſually happens, where a diſcovery is attended with ſuch conſiderable profits to the poſſeſſor, it was not eaſily to be parted with; many applications were made, but all to no purpoſe.

In length of time, however, the number of patients multiplied ſo faſt upon them, and there were ſo many, at a diſtance, deſirous of being inoculated, whom they could not attend, that then, and not till then, would they be prevailed upon to communicate their method.

Nor was it to be purchaſed without a conſiderable ſum. And though large premiums were given, all who purchaſed were laid under obligation not to communicate it to others, unleſs on the ſame conditions on which they received it. But this did not prevent its becoming pretty univerſal, for it very ſoon extended itſelf from one end of the continent to the other; and what redounds greatly to the credit of it is, that though it was committed into the hands of perſons very little acquainted with medicine, entirely ignorant of what paſſes in the animal œconomy, and utterly incapable of judging what perſons were proper ſubjects for receiving the ſmall-pox, or what diſeaſes there might be lying lurking in the habit, ſo as to render the conſtitution unfit for it; though they inoculated perſons of both ſexes, at all ages, and in all conditions of life, and that at a time when there was not above one recovered out of four who had it in the natural way; yet, out of the firſt three thouſand, that were taken account of, who received the infection under all theſe diſcouraging circumſtances, there were but five of them died, and theſe were all children under five years of age, who could not be prevailed upon to take the medicines.

But it may eaſily be believed, for reaſons already ſuggeſted, that this method was not ſo perfect at firſt, as it was capable of being rendered: various improvements were, by degrees, made upon it; and as there were ſome who did not chuſe to be at the expence of purchaſing, but would rather run the riſque of venturing to imitate the practice, with medicines of their own invention; this too would give riſe to a conſiderable variety. And even though the identical medicines ſhould luckily be fallen upon, which by the bye would be no very difficult matter, as the operation of many of them is pretty manifeſt; yet, it makes all the odds in the world, with regard to the time and quantity in which they are exhibited, and the particular regimen that is at the ſame time ordered for the patient.

It would be unneceſſary for me, at preſent, to take notice of all the different medicines that were made uſe of; I ſhall only mention thoſe which approach neareſt to the true method, and which were attended with very great advantage, together with my remarks upon them; and then I ſhall lay down that which I found, from conſtant and repeated experience, ſo happily to ſucceed with myſelf.

According to the firſt method. From ten to twenty grains of calomel is given over night in a bolus, with an anodyne. The day following, from thirty to forty grains of pulv. cornachin. is given for a purge; and the day enſuing, the patient is inoculated. After this, the calomel bolus is continued every other night, and the cornachin. the morning following, till four doſes of each have been adminiſtred. On the intermediate evenings, a draught of whey, made by boiling crem. tart. in milk, is taken going to bed; and on the day between the third and fourth bolus of calomel, the ſanguine and plethoric are bled; and this operation is repeated the day before the eruptive fever is expected.

Second Method.

℞ Pulv. antimon. crud. ʒvij
—— ſal. nitr. ℥iv, miſce.

Deflagra in mortario ferreo, ſeparentur ſcoriæ, et in pulverem tenuiſſimam reducatur.

℞ Hujus pulv. antimon. gr. vj.
calomel. ppt. gr. j. *miſce fiat pulvis.*

Which is to be given to an adult every night at bed-time, for eight nights ſucceſſively; during which time, all ſalt food, ſpirituous liquors, butter, oil, and ſuch-like diet is carefully to be avoided. The perſon is then to be inoculated; and the powders are to be repeated every night in the ſame manner, till the eruptive fever comes on, unleſs the ſalivary glands are affected * ; in which caſe, they are to be diſcontinued; and when the patient is ſeized with the eruptive fever, he is to be treated according to the general antiphlogiſtic method.

Third Method.

℞ Calc. antimon.
Crem. tart.
Sol. polychriſt.
Flor. ſulp. aa part. æqual.
m. f. Pulv. refrig. gr. xxx
vel xl pro doſi.

℞ Calom. ppt. part. duas
Sulph. aurat. ant. part. unam.
Mucilag. gum. tragacanth. q. ſ. fiat maſſ. pilular.

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* Of this, by the bye, there is very little danger, as a ſingle grain of calomel, given only every night to grown perſons, is ſeldom ſufficient, in ordinary caſes, to anſwer that purpoſe.

℞ Pulv. jallap.
—— ſcammon.
Calc. antimon.
Crem. tart. aa part æqual.
miſce fiat pulv. cathart.

The day before inoculation, give to adults ℈ij. of the purging powder, with gr. v. of calomel; and the night following inoculation, give ten or twelve grains of the antimonial pill, repeating it three nights ſucceſſively. The morning after the third pill, give the cathartic powder; and repeat the antimonial pill and purge as before. As to the refrigerating powder, a portion of it is to be given every morning, except when the cathartics are preſcribed; and it is to be continued till the eruption.

There are objections to be made to all theſe methods, and, as I apprehend, very material ones, both with reſpect to the propriety of the formulæ, and the quantity and times of exhibiting the medicines.

With regard to the firſt of them. It is a great deal too violent. His fibres, as one obſerves, ſhould be like Behemoths, and his nerves like braſs, who would venture to ſubject himſelf to ſuch a treatment. The authors of this practice ſeem ſufficiently aware, that a bolus from ten to twenty grains of calomel, every other night, is by much too large a quantity, and would ſoon ſalivate the patient; and therefore they order a violent doſe of a draſtic purgative, to carry it off the next morning, before it can be abſorbed into the ſyſtem. This, in my opinion, is doing and undoing with a vengeance. Beſides, antimony, which ought, as will afterwards appear, to have a conſiderable ſhare in the preparation, is here entirely omitted.

In the ſecond method there is, firſt, a proceſs laid down for making a powder, with ſeven parts of antimony and four of nitre; whereby a tolerably ſtrong preparation is produced; whoſe doſe, to adults, as an emetic, is, from one to four or five grains.

The quantity of nitre here made uſe of, is not ſufficient to deflagrate all the ſulphur from the antimony; but yet, it ſeparates enough to render the regulus liable to be acted upon pretty ſtrongly, by any acid it may meet with in the ſtomach. The preparation is very analogus to the crocus antimonii of the London College.

The objection I have to make to the preſcription which follows, is, that the authors of it have fallen into an oppoſite error to thoſe who invented the firſt method; for here the quantity of calomel is a great deal too ſmall; while that of the antimony is out of all proportion. One grain of calomel, given only every night, is by no means ſufficient to effect the change which is here required: and it is by no means neceſſary to ſubject the patient to the diſagreeable operation of ſix grains of this antimonial every evening; beſides, the joining theſe two medicines together, eſpecially as calomel is given at no other time, diſappoints the very deſign of giving mercury, by throwing it off as ſoon as it is taken into the ſtomach.

The third method comes much nearer the true one, both with regard to the medicines themſelves, and the quantity in which they are given. There are, however, ſome chymical abſurdities, which I ſhall, in the firſt place, take notice of.

The preſcription, we ſee, conſiſts of calx antimon. ſal. polychreſt. crem. tart. and flor. ſulph. As the calx antimon. being an antimonial preparation, has been laid a good deal of ſtreſs on by inoculators, it may not be amiſs to examine a little particularly into the merits of that medicine.

Calx of antimony is made by deflagrating crude antimony with three parts of nitre. Now, with regard to the different preparations of antimony in general, let it be remembered, that their different degrees of activity depend upon, more or leſs of the ſulphur's adhering to the reguline part. Thus, different ſorts of crude antimony, as they contain different proportions of ſulphur in their compoſition, differ, on this account, in the degree of their activity.

If the ſulphur of antimony is ſeparated, by deflagration with nitre, the greater the quantity of nitre is, to a certain point, the more of the ſulphur is conſumed, and the more does the metal, thus diveſted of its corrector, exert its virulence. Thus, antimony, deflagrated with one-ſixth its weight of nitre, vomits and purges, for the moſt part, very mildly, in doſes of eight or ten grains: with half its weight, it vomits ſtrongly, in the quantity of from one to five or ſix grains; and with equal its own weight, it proves, in the ſame doſe, a moſt violent emetic.

This ſeems to be the proportion which pretty exactly ſeparates all the ſulphur from the metal; and, conſequently, produces a medicine of the greateſt virulence.

If, therefore, after this, you increaſe the quantity of nitre, part of the antimony will be converted into a calx, and the medicine will become milder; hence, if twice the weight of nitre be made uſe of, the metal will be ſo far calcined, as to appear white; and the medicine will become ſo mild, as to occaſion only ſome ſlight nauſea and gentle vomiting: but, if thrice its weight of nitre be deflagrated with one part of antimony, as in the preſent caſe, which we have now under conſideration, the antimony becomes ſo much a mere calx, that, by being ſubjected to the operation of waſhing, it becomes entirely indolent.

In this proceſs, however, a part of the nitre is changed by the ſulphur into a neutral ſalt, by the vitriolic acid contained in the ſulphur, which unites with the fixed alkali; while the nitrous acid and the phlogiſton fly off in the inflamation, and this produces a nitrum vitriolatum, which is a medicine of no great activity, even if it was ſuffered to adhere to the calx; but, by ſubjecting that to the operation of waſhing, this alſo is ſeparated from it.

The ſal. polychreſt. is no ways different from the nitrum vitriolatum I have juſt now mentioned, and very little is to be expected from it; eſpecially if we conſider, that it is formed of a volatile vitriolic acid, which is eaſily decompoſed by means of a vegetable acid, which it is very liable to meet with in the ſtomach[*]. But even if it ſhould fail of that, ſo great is the want of chymical knowledge in thoſe who invented this formula, that in the very next article they have added cream of tartar, which they ſeem only to have conſidered as a gentle aperient and refrigerant in itſelf; not knowing that, when added to this other medicine, it is ſure to decompoſe it.

As for the flos ſulphuris, it is in itſelf but an inert medicine at any rate; but it has this certain and remarkable effect of deſtroying the force of metallic preparations, eſpecially that of mercury; in ſo much, that, if a ſalivation is excited, flowers of ſulphur immediately lower it. And whatever its effects may be upon the different preparations of antimony when taken into the body, its uſe muſt be highly improper in a courſe of medicines, whoſe ſucceſs ſo much depends on the effects of mercury.

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[*] Dictionaire de Chemie, Vol. II.

What farther is to be obſerved with regard to the other formulæ made uſe of in this method, will be taken notice of in another place; I ſhall only obſerve here, that conſiderable amendments may be made in the purging powder. The calx antimon. is intirely an uſeleſs addition, tending only to render the powder more bulky, which is, at any rate, quite enough ſo; and the powder of jallap is ſufficiently draſtic, without the addition of ſcamony.

But before I proceed to mention the times and quantities in which the medicines ought to be given, and to explain the manner in which they operate, to produce their deſired effects, which I ſhall do when I lay down my own method, it will be neceſſary to take a view, and explain the nature of the diſeaſe itſelf in its natural ſtate, which will lead us to lay down indications of cure, and then the propriety of the method employed will appear manifeſt.

I ſhall begin with obſerving, in the firſt place, that the ſmall pox is a diſeaſe which was entirely unknown to the antients; for neither Hippocrates nor Celſus make any mention of it; and it is not to be ſuppoſed that ſo accurate an obſerver as the former, who has ſo attentively marked other diſeaſes, ſhould paſs by this ſo remarkable an one unnoticed.

Rhazes informs us, that Aaron, an Alexandrian phyſician, who practiced about the year 622, was the firſt who gave a deſcription of it; whence it has been conjectured, that, poſſibly, the ſmall pox took its riſe in Egypt. But it is not certain whether it firſt appeared in Africa or in Arabia. It is, however, undoubtedly, a diſeaſe of hot countries; and was firſt brought by the Arabs into Spain, at the time of Mohammed's conqueſt; and thence, by means of war and commerce, diſperſed itſelf all over Europe.

With regard to the manner in which the diſeaſe was originally produced, we are

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left in the greateſt uncertainty about it; and it is not worth our while to ſpend much time in examining into that matter; for we know, that there is no other way of propagating it at preſent but by infection. This infection is always received from perſons labouring under the diſeaſe; and may be carried by means of cloaths, goods, or any ſpongy ſubſtances that can afford it a nidus, to a great diſtance; and it is communicated to perſons in health, either by myaſmata floating in the air, which are received into the lungs, or, mixing with the ſaliva, are carried down into the ſtomach; or they are abſorbed by the pores of the ſkin all over the ſurface of the body; or it may be communicated by means of variolous matter in the way of inoculation.

Whatever way this infection is received, the time which it requires to produce the fever, and other ſymptoms of the diſeaſe, in different patients, is very various. There are inſtances of perſons who have been ſeized with it any time from the ſixth, nay, from the third or fourth, to the eighteenth day, and even the twentieth; and this difference has taken place in different perſons, who have all received the infection from the ſame patient.

As the degree of violence with which this diſeaſe affects different patients is very different, that we may have a more diſtinct idea of it, we may very properly divide the natural ſmall pox into three ſpecies.

In the firſt of theſe, there is a violent fever; in which, ſometimes the brain, ſometimes the lungs, and ſometimes the throat, and other parts are greatly affected. Here the pulſe is rapid, full, tenſe; the breathing hot, ſhort, and laborious; the heat very ſharp, and the urine high coloured; the thirſt great, the tongue dry and foul; the pain of the head, back, loins and limbs exceedingly acute; and though there is a thick denſe blood at the beginning, with an inflammatory buff on the top of it; yet its craſis ſoon becomes diſſolved; black and livid ſpots appear; hæmorrages inſue from the noſe, uterus, and kidneys; and the puſtules turn black, gangrenous, and often bloody ſoon after the eruption.

The ſecond ſpecies is of a much gentler nature; the fever is of the remiting kind, and all the ſymptoms are much leſs violent. It generally ſeizes about the eighth or tenth day, and is more moderate in the morning than in the evening. About the fourth day from the attack, eruptions appear here and there in different parts of the body; ſoon after which, the fever entirely abates, and the patient finds himſelf as well as formerly.

But there is a third ſpecies, where the diſeaſe many times comes on with the uſual ſymptoms of a ſlow nervous fever, and the ſick are often a long time complaining, before they become certain that they are labouring under it. The fever is low, the ſpirits ſunk, the pulſe weak, quick and fluttering, the countenance pale and fallen, the urine crude and thin, no great heat nor thirſt, but a continued giddineſs and heavineſs of the head, with tremblings, a perpetual nauſea and vomiting, univerſal uneaſineſs,

neſs, weakneſs, weарineſs, &c. and theſe ſymptoms I have ſometimes known continue for ſix or ſeven days before the ſmall pox made their appearance, and then they generally proved to be of a very bad ſort, pale, crude, pitted and ſeſſile, never riſing well or maturating kindly, but continuing flat and flaccid, or runing together in large watery bliſters, full of thin undigeſted *ichor*. In the face, from a deadly pale cadaverous hue, they generally turned to a ghaſtly black, and formed a very adheſive cruſt, if the patient lived long enough.

From a very ſlight review of this diſeaſe, and the circumſtances attending it, I think it pretty evidently appears, that it is to be conſidered, contrary to the generally received opinion, rather of the putrid than of the inflammatory kind; and as it is a point of great conſequence, in examining into the nature of it, to determine this matter, I ſhall endeavour to ſupport my opinion by the following arguments.

In the firſt place, from the hiſtory, we learn, that it is properly a diſeaſe of ſummer,

mer, ſince it firſt took its riſe in hot climates; and it has long been known, that heat is as much the parent of putrid as cold is of inflammatory diſeaſes.

Hippocrates, in enumerating the diſeaſes of ſummer, makes mention of a great many putrid ones, which were the produce of that ſeaſon; " *Æſtate vero accidunt et febres* " *continuæ, et καῦσοι et tertianæ plurimæ, et* " *vomitus et diarrhœæ et oris exulcerationes,* " *et genitalium putredines, et puſtulæ quædam* " *miliariæ*[*]. And Galen, deſcribing the nature of putrefaction, ſays, " *Putredo eſt* " *totius corporis putreſcentis in corruptam* " *naturam mutatio, non enim proprio calore* " *corrumpitur quidquam*[†]. That the ſmall pox rages with moſt violence in hot weather, while the winter, which is capable of putting a ſtop even to the plague itſelf, always renders it milder, is an obſervation common to every one: and hence, Dr. Mead, from the great analogy there is betwixt them, very properly concludes, that " It

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[*] Sect. 3. aph. 28.

[†] Method. medend. l. 11. c. 8. Charter. tom. 10. p. 254.

" is a plague, *ſui generis*, originally bred in
" Africa, eſpecially in Ethiopia, where the
" heat is moſt exceſſive*".

Secondly, It is an infectious diſeaſe. Now all the infectious diſeaſes we are acquainted with, ſuch as the meaſles, the ſmall pox, and the plague, are all of them the product of heat, and are therefore of the putrid kind. Hence, Ariſtotle tells us, that dry ſoutherly winds, which were the hoteſt where he lived, produced peſtilential fevers†. Avenzoar ſays, that the plague was brought on by a dry atmoſphere. Rhazes informs us, that when the ſummer was exceſſively hot and dry, and ſucceeded by a hot autumn, in which rains came on very late; then the meaſles quickly ſeized thoſe who were diſpoſed to them, viz. lean, hot, and bilious perſons ‡. Livy tells us of a terrible plague, that was excited at Rome, by too much dryneſs §; ſuch a one as Nicephorus gives us a deſcription of ‖. Virgil, in his third book of the Æneid, where he is giving an account of his *Heroe's* journey into Crete, relates, that the plague was occaſioned there by a ſtate of heat and dryneſs, which had corrupted the atmoſphere[*]. And Diæmerbroeck attributes the plague of 7 Nœmaguin to the exceſſive heat and dryneſs of the ſummer[†].

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* Mead's works, p. 310.

† Prob. 1.

‡ Vide Mead's works, p. 362.

§ Decad. 4. l. 1.

‖ Lib. 15. c. 10.

What have given riſe to the opinion, that the ſmall pox is an inflammatory diſeaſe, are evidently the high fever, full, hard and tenſe pulſe, delirium, and ſuch like, which generally happen in the firſt ſpecies of this diſeaſe. Theſe, it is true, are ſymptoms common to inflammation; but then they are no more than what we meet with in the very worſt ſpecies of the putrid fever; and they proceed from the infectious myaſmata, which act as a ſtimulus on the animated fibers; for let it be remembered, that all infection is to be conſidered as acrimony.

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[*] —— Subito cum tabida membris
Corrupto cæli tractu, miſerandaque venit
Arboribuſque ſatiſque lues, et lethifer annus.
Linquebant dulcis animas, aut ægra trahebant
Corpora, tum ſterilis exurere Sirius agros.
Ardebant herbæ, et victum ſeges ægra negabat.
Æneid. l. 3. ver. 147.

[†] De Peſte, l. 1. c. 3.

All the difference, therefore, that we have an opportunity of obſerving in the ſeveral ſpecies of ſmall pox, is owing either to the degree of this acrimony, or to the different ſtate of the conſtitution to be acted upon. Hence, if the patient is ſtrong and robuſt, if his fibres are tenſe and rigid, when the ſtimulus is applied to them, they will contract with greater violence, the ſolids will act with the more force upon the contained fluids, a greater attrition, and conſequently heat will be excited; and all the febrile and inflammatory ſymptoms will be produced, which are to be met with in the firſt ſpecies of this diſeaſe. But if, on the other hand, the fibres are lax, the conſtitution delicate, and the *vis vitæ* low, the circulation will be languid, little heat or inflammation will be excited, and all things will turn out as in the third ſpecies.

But this infection is not to be conſidered merely as an inflamatory ſtimulus; for a mere inflamatory ſtimulus will never be able

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to produce a putrid diſſolved blood, pætechiæ, ichorous diſcharges, bloody urine, hœmorrages and ſuch like ſigns of putrefaction, as we have mentioned in the firſt and third ſpecies. It is, therefore, beſides its having the peculiar property of always producing ſmall pox, to be likewiſe conſidered as a putrid ferment, on account of the ſigns of putrefaction which ſo ſoon ſupervene*; and putrid bodies, as appears from Sir John Pringle's experiments, are the moſt ſeptic ferments of any ſubſtances we are acquainted with.

But there is a conſiderable difference to be met with in variolous infection. Though it is all of it more or leſs of a ſeptic nature, yet ſome is much more ſo than others.

When the ſmall pox gets into a family, it is often obſerved, though not a conſtant and invariable rule, that the ſeveral individuals have it with pretty nearly the ſame violence; and hence we often hear people ſpeak of the particular ſort of ſmall-pox which is come in amongſt them: and there is a very manifeſt difference to be obſerved in the ſmall pox, according as it happens at different ſeaſons of the year. Infection, taken when the puſtules are only beginning to fill, is found to produce milder ſmall-pox, than when they had come to full maturity; all of which variety ſeem to be in a great meaſure owing to the different degrees of acrimony in the infection. But the different ſorts of ſmall pox do not wholly, and perhaps not ſo much depend upon any difference in the nature of the infection, as on the conſtitution of the patient who receives it; which appears from this, that the very ſame infection will often produce very different ſmall pox, in different patients. I have known the beſt infection produce the worſt of ſmall-pox, in thoſe who have catched it the natural way; and I have known the moſt putrid ſmall-pox, which have killed the patient, produce the very mildeſt ſort in another perſon, who has catched the diſeaſe at his funeral.

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* The Count de Lawrige, I remember, when ſpeaking, about two years ago, of ſome experiments he had made upon the blood of perſons ill of different diſeaſes in the hoſpitals at Paris, obſerved, that he found that that which was drawn from patients labouring under the ſmall pox, putrified much ſooner than blood drawn from any other patients.

But whether this doctrine, which aſſerts, that the variolous infection is of a ſeptic nature, be admitted or not, it muſt, at any rate, be allowed, that it is an aſſimilating ferment. For though the time which it requires to produce the diſeaſe, after it has been taken into the ſyſtem, is very undeterminate, yet it is never capable of exciting a fever, and the other ſymptoms of it as ſoon as it is inſerted; nor does this happen till it has acquired additional force, by converting the juices into its own nature. Therefore, if only this point ſhould be granted, it is ſufficient to anſwer our preſent purpoſe; and our reaſoning, in either caſe, will equally apply, for explaining the nature of the ſmall pox, for what ever has the power of promoting fermentation, has likewiſe a tendency to produce putrefaction; and that for this reaſon, becauſe every degree of advancement which is made in fermentation, is a ſtep towards that period.

We know very well, that all the animal ſubſtances we are acquainted with, except a few inſects which have not moiſture enough, ſpontaneouſly run into putrefaction; but all animals conſiſt of their aliments, and theſe are chiefly vegetables, which are of an aceſcent nature. This occaſioned a great deal of difficulty amongſt phyſicians formerly, becauſe they could not tell how this change from aceſcency to a ſtate of putrefaction was brought about, for they imagined that it was effected by ſome means or other very different from fermentation; but here they were evidently miſtaken, for putrefaction and fermentation, whether this is of the vinous or acetous kind, are all of them only different ſtages of the ſame proceſs, as appears from this, that they always follow in order, one after another, in the ſame ſubject; that is, if a body, which has gone through the vinous and acetous fermentation, is placed in a proper degree of heat, which heat, muſt vary according to the particular nature of the ſubject, it will immediately run into a ſtate of putrefaction. This fact is abundantly confirmed by experiments, and therefore it is not neceſſary for me, at preſent, to advance any arguments in proof of it.

But the ingenious Dr. Macbride, of Dublin, has likewiſe proved, beyond controverſy,

verſy, that the concoction of our aliment, is no other than a true fermentation [*].

And how can it be otherwiſe, for if all mixtures, conſiſting of animal and vegetable ſubſtances, when furniſhed with the requiſite quantity of water, and kept in a proper degree of heat, naturally and ſpontaneouſly run into fermentation, without the aſſiſtance of any exciting ferment; how is it poſſible but that the ſame kind of mixtures muſt ferment in the body, eſpecially when at their very firſt entrance into the mouth, and afterwards, as they deſcend through the fauces and œſophagus into the ſtomach, they meet, and are mixed with humours which would immediately bring on fermentation, even if their own nature was averſe to it [†].

If, therefore, the natural tendency of our aliments, from the time they are taken in, till they are converted into nouriſhment, and again excreted out of the body, is from an aceſcent ſtate, to a ſtate of putrefaction; how much more readily will this change be brought about in the ſyſtem, when promoted by ſo powerful a ferment as the variolous infection. But this opinion will be farther confirmed, by examining into the cauſes which tend to aggravate the ſmall pox, for they will all of them be found to be ſuch as either promote, or do not retard animal putrifaction.

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[*] Vide eſſay 2. tab. 1. 2.

[†] Boerhaave and Hoffman's opinion, that the ſaliva and gaſtric juice, greatly promote the fermentation of vegetables, is abundantly ſupported and proved by Dr. Macbride's experiments, vide eſſays, tab. 2. numb. 2. 4. 6. Vide etiam Pring. append. exper. 29. 30. &c.

The occaſional cauſes are, animal food, impure and corrupted diet, a plethora, ſtrong and robuſt habit of body, high ſeaſoned food, ſpirituous liquors, alkaline ſalts, old age, anxiety or fear, heat, a confined atmoſphere, and obſtructed perſpiration.

Animal food deſerves to be mentioned among the firſt of theſe, and the reaſon is very plain and obvious. For ſince this fermentation, of which we have been ſpeaking, is inceſſantly going on, if there is not, from time to time, a new ſupply of freſh humours, formed from aliments of an aceſcent nature, thrown in upon thoſe which are converted into our own nature, and have already gone through the firſt and ſecond ſtages of fermentation; theſe will very ſoon paſs on into the third, which is the putrefactive ſtate; but animal food is not fit to ſupply this aceſcency, becauſe it is already exactly in the ſame ſtate with our own fluids; and much leſs is to be expected from impure or corrupted diet.

Even amongſt animal food, there is a conſiderable difference to be made, becauſe ſome kinds are much leſs liable to putrify than others.

Young animals, and thoſe which are ſmall of their kind, whoſe fibres are lax, have not their juices ſo highly animalized, as large, ſtrong, and robuſt animals, and are therefore leſs prone to putrifaction; for chyle, we know, and even milk, which have not long been acted upon by the ſolids, are ſtill in an aceſcent ſtate; and veal, lamb, chicken, and ſuch like, are but one ſtep farther advanced; nay, veal broth is known often to turn ſour, while beef or fiſh are diſpoſed very ſoon to putrify *.

Secondly, A plethora is always prejudicial, and that on two or three accounts: for when the veſſels are ſo much diſtended with fluids, that they have not power to contract, and therefore not to dilate themſelves, the circulation being, as it were, choaked up, becomes languid, and all the ſecretions and excretions are performed in leſs quantity. The ſeptic ferment, in the mean time, has a larger maſs to act upon, and conſequently a greater quantity of variolous matter will be accumulated: beſides, we know very well that it is a matter of great conſequence in nutrition, that the different parts of our diet bear a juſt proportion to one another, which ought likewiſe to vary according to the particular circumſtances of the patient; for if a perſon, of a weak conſtitution, drinks too much of watery liquors, it will occaſion dropſical ſwellings; and dropſical perſons always

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* Homberg tells us, that he extracted a conſiderable quantity of acid from the blood of young animals, but old ones did not yield it in any ſuch quantity.

find their legs ſwell more than uſual after drinking; nay, ſome people, who are not dropſical, but of a lax conſtitution, have often obſerved their legs ſwell a little after drinking freely. So, in the preſent caſe, where there is ſo great a quantity of perfectly animalized and well aſſimilated juices, the whole of them is ſtrongly diſpoſed to putrefy, and there is not ſpace left to throw in a ſufficient quantity of aceſcent food to correct their tendency.

Strong and robuſt perſons, who have been accuſtomed to hard labour, and whoſe fibers have become tenſe and rigid through too much exerciſe, have always been found very unfavourable ſubjects for the reception of the ſmall pox. Yet, I have never ſcrupled to communicate the infection to ſuch, becauſe they afford an excellent opportunity for the medicines to operate; but it is always neceſſary entirely to change and alter this diſpoſition of body during the courſe of the preparation. For although we have proved, that the change our fluids undergo, from an aceſcent to a putreſcent ſtate, is brought about by means of fermentamentation; yet, as no fermentation can produce any thing ſimilar to animal fluids out of the body, ſo neither can the aliments be converted into them, without the action of living fibres; and therefore the ſtronger the action of the ſolids is upon the fluids, the quicker will this change be induced; and, conſequently, the ſooner will the humours become putrid. A hare or a ſtag that have been hunted, will not keep near ſo long as thoſe that have been killed without undergoing that ſevere exerciſe; nay, I have known them become ſo putrid in twenty-four hours after they were killed, that they have not been fit to make uſe of*.

To this head we may refer high-ſeaſoned food, rich ſauces, ſpirituous and fermented liquors, and alkaline ſalts; for they do not act by diſſolving and putrefying the humours immediately, as is generally imagined;

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* Is not Dr. Mac Bridge's remark on fermenting alimentary mixtures exactly conformable to this? For he obſerved, that, by frequently agitating the vials in which they were contained, the fermentation was greatly expeded.

ed; on the contrary, they are of an antiſeptic nature. The firſt effect of ſpirituous liquors is to give life and vigour to the whole body; to raiſe and exhilerate the ſpirits, by giving an agreeable ſenſation to the ſtomach; for we know, that, as often as the nerves of the ſtomach are diſagreeably affected, we become melancholy and low ſpirited. But theſe exhilerating effects are not of any long continuance; they ſoon ceaſe; and a few hours afterwards, when the whole of the liquor has got into the blood, we feel an unuſual heat, thirſt, quick pulſe, and, in reality, for a time, we labour under a fever; and this fever, which is occaſioned by the ſtimulus that is applied to the living ſolids, exciting them into more frequent contractions, produces, pretty nearly, the ſame effects as violent exerciſe; and it is, by deſtroying the acid in the primæ viæ, which is the chief corrector of the putreſcency of the humours, as well as by acting as a ſtimulus, that alkaline ſalts become prejudicial in this diſeaſe.

Aged perſons, or thoſe who are pretty far advanced in life, are generally eſteemed unfavourable ſubjects for inoculation; and it muſt be acknowledged, that they are not ſo ſafe as infants, or thoſe in the younger part of life. I have, however, inoculated ſeveral about the age of ſeventy, and they all had the diſeaſe very mildly. But they are leſs fit for receiving the ſmall pox, becauſe their fibres are rigid, their ſecretions and excretions are leſs; they perſpire leſs than young perſons; and their fluids have a much greater tendency to putrefaction, which appears from the fœtor that attends them; and, probably, this proceeds from their fluids being detained longer, and from the coſtive habit of ſuch perſons, which gives occaſion for a greater quantity of the putrid particles to be abſorbed from the fœces into the ſyſtem *; and it is on account of its ſuppreſſing perſpiration, that anxiety, fear and apprehenſion of danger from the diſeaſe, are ſo juſtly eſteemed ominous; for theſe univerſally leſſen the ſecretions and excretions, as appears from Sanctorius's obſervations.

I come now to ſpeak of a cauſe which, it has univerſally been allowed, increaſes

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* Haller. Primæ Lin. Phyſiolog. ſec. 967.

putrefaction, and which is now pretty generally believed to be very prejudicial in the ſmall pox: I mean heat. But though the fact be univerſally admitted, it is not ſo eaſy a matter to tell how heat acts upon the body, ſo as to produce this effect. This much, however, is certain, that a certain degree of it is abſolutely neceſſary for conducting fermentation; and the greater the heat is in our atmoſphere, the more will that be expeded: cold immediately puts a ſtop to it.

There are two kinds of heat here to be taken notice of; that which proceeds from a perſon's being expoſed to the direct rays of the ſun, and that which is occaſioned by wearing a great quantity of clothes, by being confined to bed, or being ſtived up in a chamber; all of which have the ſame general effects; but their manner of operating to produce theſe effects is different.

With regard to the firſt of theſe, heat occaſioned by the direct rays of the ſun, produces putrefaction pretty much in the ſame manner as ſtrong fibres and too much exerciſe: for, let it be remember'd, in the firſt place, that heat univerſally renders the ſyſtem more irritable, and conſequently, more liable to be acted upon by any ſtimulus, while cold acts as a ſedative.

Secondly, heat rarifies the blood; and by this means, makes it occupy a greater ſpace than it did formerly. But it is a well-known law in hydraulics, that if the quantity of any fluid is increaſed, while the ſpace through which it is to paſs continues the ſame, its motion muſt likewiſe be increaſed, that it may be able to perform its circuit in a given time. In the preſent caſe, therefore, the motion of the blood being increaſed, all the ſecretions of the body will be increaſed in the ſame proportion; for, in the animal body, the more fluids are brought about in a given time to the ſecreting organs, the greater quantity, *cæteris paribus*, will be ſecreted. Hence the thinner, more volatile, and, if you will, ſpirituous, and watery parts of the blood will be exhaled from the external and internal pores of the body, which are expoſed to the air; and that which remains, for want of the more ſubtle parts, will be, as it were, inſpiſſated. The ſolids will, at length, become dry and rigid; the oily and ſaline parts of the blood, by this increaſed action, will be violently agitated; and by the continual attrition which will take place between the ſolids and fluids, they will be ſharpened and rendered more acrimonious.

But the other kinds of heat we have mentioned, while they promote fermentation, ſeem to act, principally, by confining the putrid or infectious particles which are conſtantly ſecreted through the different outlets, and by preventing them from flying off; hence we are kept bathing, as it were, in an atmoſphere of our own bodies, and the infectious particles are again abſorbed, ſo as to act as an additional ferment in the ſyſtem. Hence Sydenham affirms, " *nullâ magis* προφασει *promovetur* " *immodica materiæ varioloſæ aſſimilatio,* " *quam ſi æger intempeſtive ſe lecto addicat,*

" *viz. ante diem ſextum a prima invaſione,*
" *vel quartum incluſive, ab eruptione* *."
And Celſus's advice will apply full as well here, as in any other fevers, " *Ut amplo* " *conclavi teneatur æger quo multum et purum* " *aerem trahere poſſit, neque multis veſtimentis* " *ſtrangulandus, ſed admodum levibus tantum* " *velandus* †;" for if a man in health contaminates a gallon of air in the ſpace of a minute, ſo as to render it unfit for reſpiration, how much more impure will it be rendered by a perſon in this diſeaſe, where infectious myaſmata are continually flying off from the ſurface of the body. Laſtly, if the abſorption of theſe particles is hurtful; it is very evident, that obſtructed perſpiration, by which they are retained in the body, muſt likewiſe be prejudicial in this diſeaſe.

From what hath been ſaid of the nature and cauſes of the ſmall pox, the indications to be followed in preparing the body for having it by inoculation are, evidently, two;

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* Diſſert. Epiſt. G. Cole, M. D.
† L. III. C. 7. P. 143.

The firſt is, to oppoſe; and by that means to moderate the influence of the variolous infection, in aſſimilating our juices.

Secondly, to evacuate the variolous matter, as faſt as it is formed, out of the conſtitution.

The firſt of theſe, principally, relates to the diet and regimen of the patient. The ſecond, to the medicines to be employed. And with regard to the firſt of theſe, from what has been ſaid under the occaſional cauſes, it evidently appears with how much propriety a cool regimen is ordered.

We have ſeen what are the natural bad effects of heat; and, therefore, we may reaſonably expect the contrary to happen from an oppoſite treatment.

A ſucceſſion of free air not only cools and fans our bodies, but wafts away the atmoſphere of putrid particles which con-

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tinually exhales from, and ſurrounds them.

There are, however, ſome, I know, who inveigh exceedingly againſt the extreme cold regimen which has been preſcribed, though it is, in general, found ſo very ſervicable. And, indeed, at firſt ſight it ſeems very abſurd to expoſe perſons labouring under a diſeaſe to degrees of inclemency in the atmoſphere, which would certainly prove hurtful to perſons in health.

But it is very certain, that perſons labouring under certain diſeaſes are better able to bear thoſe extremes which are oppoſite to their natures, than even if they were in health. A perſon in a high fever may be expoſed to a greater degree of cold, without being ſenſible of any inconvenience from it; and to thoſe who are ill of the natural ſmall pox, nothing can be more agreeable than the admiſſion of freſh air. When they have been almoſt ſuffocated with the diſeaſe, and gaſping for breath, I have known the poor expiring creatures, by throwing open the windows, in the ſevereſt ſeaſons, as it were, reanimated, and ſo rejoiced have they been at the agreeable change, that, on no account, neither night nor day, would they ſuffer them to be ſhut. And the reaſon why it is ſervicable, is obvious; for, where there is a ſeptic ferment continually aſſimilating and putrefying our fluids, a greater degree of cold can not only be born, but is requiſite to oppoſe it.

This practice is by no means new; for Rhazes, who is the firſt author of any note that wrote on the ſmall pox, made uſe of it.

He lived in the country where the diſeaſe took its riſe, and, conſequently, had an opportunity of viewing it in its genuine and natural ſtate; and conſidering it as a truly putrid diſeaſe, he ſoon experienced the good effects of ordering an exceeding cool regimen.

He not only ordered the chambers of his patients, who were preparing for the ſmall pox, to be kept cool, by the free admiſſion of air; but he likewiſe directed them to drink water cooled by ſnow, or clear ſpring water, with which their chamberswere alſo to be ſprinkled. Nay, he ſays, that the patient may go into cold water, at noon, and ſwim about in it; and when the ſymptoms of the diſeaſe begin to appear, in order the more effectually to extinguiſh the internal heat and putrid tendency, he adviſes him to " drink water, made cold in ſnow " to the higheſt degree, very plentifully " and often, ſo that he may feel the cold- " neſs of it in his bowels.

" If, after this, the fever and burning " return, give this water a ſecond time, " two or three pints, or more, in the " ſpace of half an hour: and if ſtill the " heat return, and the belly be full of " water, make him vomit it up, and then " give it again. And he adds, that, if " the water finds a paſſage either by ſweat " or urine, you may be aſſured the patient " is in a good way."

Dr. Sydenham's practice was very ſimilar to his, with reſpect to cold; for, at moſt, he would not ſuffer his patients to keep their beds till the firſt appearance of the eruption; nor would he allow more fire in their rooms, or more clothes on their beds, than what they were accuſtomed to when in health; but he often enjoined even a much ſtricter regimen *.

But I do not mean to recommend Rhazes's practice, in giving cold water in the manner in which he did, nor to enforce the cool regimen in the full extent of it; for, though there can be no doubt but it is, in general, ſervicable; yet, like every other good thing, it may be abuſed by carrying it to too great a length. Food, which is ſalutary, and abſolutely neceſſary for the ſupport of man, may, by eating too much of it, occaſion a ſurfeit. And I think there is a degree of preſumption in " carry-

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* For a more particular account of his practice, I refer the reader to his own works, or to Dr. Baker's late very candid and ingenuous pamphlet upon the ſmall pox, where he will meet with ſeveral additional arguments in favour of that practice.

"ing patients into the fields while ſhiver-"
"ing under the rigor of the fever, in al-"
"lowing them no liquor but what they"
"have been able to procure for them-"
"ſelves at the pump, while the fever has"
"been upon them, and in their having"
"been indiſcriminately expoſed to the air"
"in all ſorts of weather, and in all ſea-"
"ſons, during every period of the erup-"
"tion."

As the cool regimen is not the only remedy; ſo, neither is the whole, nor, perhaps, ſo much ſtreſs as ſome are ready to allow, to be laid upon it. Another very material circumſtance to be attended to, is, the diet of the patients.

I need not now explain why fleſh, in general, ought to be abſtained from, nor why the aliments ought to be chiefly vegetable, and of the aceſcent kind.

Milk, though it is an animal production, has not yet been ſo much acted upon by the ſolids, as to loſe its aceſcency, and is, therefore, very proper.

Oils, and oily ſubſtances, are to be avoided, not only becauſe they are the moſt indigeſtible of all aliments, but becauſe they invelope and tend to deſtroy the effects of medicines.

In general, the patient may be allowed tea, coffee, or weak chocolate, with dry toaſt; rice-milk, milk-gruel, ſkimmed milk, and ſuch like, for breakfaſt.

For dinner, rice-pudding, apple-pudding, apple-pye, plumb or plain pudding, with vinegar ſauce, made by adding ſugar and vinegar to a proper quantity of boiled flour and water. Rice-milk, milk and flummery, and the productions of the kitchen garden, with the uſe of ſalt; for that may be uſed, though ſalt meats are objected to, and none of the ſame bad conſequences will follow from it. Moſt kinds of fruit may be eaten at pleaſure, except juſt when the patients are taking medicines.

Supper, in general, had better be omitted, if that can be done conveniently; but, at any rate, it ſhould be light, cooling, and of eaſy digeſtion: roaſted potatoes, turnips, and ſuch like; or any of the above ſpoon-meats will be proper; but all fleſh, butter, cheeſe, and ſpiced food muſt be religiouſly avoided.

As all ſpirituous, vinous and malt liquors would be highly pernicious, I would not adviſe any thing more for drink than toaſt and water, milk and water, or lemonade. Nor ought the patient to uſe much exerciſe; ſome, however, is neceſſary, as far as is requiſite for enjoying a change of air, and for keeping up a free perſpiration.

To anſwer the ſecond intention, which is to evacuate the variolous matter as faſt as it is formed out of the conſtitution, nothing can be better calculated than the medicines that are uſed.

Mercury, antimony, and their different preparations, are principally to be depended upon.

It has been imagined that theſe medicines act as antidotes, which deſtroy the very nature and exiſtence of variolous virus. But there are no inſtances to prove, that any, or both of them, mixed with variolous infection, will deſtroy its efficacy in producing ſmall pox.

In the rude and uncultivated ages of philoſophy, the doctrine of antidotes and ſpecifics was very much in vogue. Men, either from a notion, that it would be preſumptuous in them to attempt to ſearch into the *recondita* of things, or from a lazineſs of diſpoſition, which prevented them from giving themſelves much trouble, were very ready to reſolve effects into ſome unknown or occult qualities. But a genius for more free enquiry has long ſince taken place, we are now diſpoſed to account for effects from natural cauſes; and the doctrine of antidotes and ſpecifics is very much exploded. We now admit of nothing in philoſophy as matter of fact, but what is the reſult of experiment; nor do we look for more cauſes than what are ſufficient to explain the phenomena; and when theſe are wanting, rather than reſolve effects into ſuperior agency, or unknown power, we had better acknowledge, at once, that we know nothing at all about them.

But mercurials and antimonials are known to be the moſt univerſal and powerful evacuants of any we are acquainted with. They are emetic, cathartic, diuretic, and ſudorific, to an eminent degree; but their different preparations are variouſly adapted for anſwering theſe purpoſes: ſome are better ſuited to promote one evacuation, and ſome another; but all of them greatly promote the ſecretions and excretions; then why need we have recourſe to a ſpecific power for their effect in the ſmall pox, when evacuation will ſufficiently account for it?

It would exceed the narrow limits of this little performance, to give a particular account of the peculiarities belonging to each preparation; nor is that requiſite;

ſice it will be ſufficient to ſpecify theſe which have been uſed with moſt ſucceſs in the preſent diſeaſe, and to explain the manner in which they operate *.

From a knowledge of the nature of the diſeaſe, I think it pretty evidently appears, that medicines can be of little uſe in preparing for the ſmall pox, before the infection is received. Nor does there, indeed, ſeem to be much occaſion for ſubjecting the patient, long before this, to a ſtrict diet and regimen. The only uſe it can be of, is, to reduce the conſtitution to a ſtate of mediocrity; and to prevent it from running into thoſe extremes, which might otherwiſe be injurious; but, till the ferment is received, there is no aſſimilation to be moderated, or oppoſed, nor any virus to be thrown out of the conſtitution.

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* It is with pleaſure I can inform the public, that they will very ſoon be favoured with a performance on the ſubject of Antimony and Mercury, and the uſe of their ſeveral preparations in the cure of diſeaſes, by my very learned and ingenious friend, Dr. SAUNDERS, who gives LECTURES on *Chemiſtry* and *Materia Medica*, in this metropolis.

For the purpoſes, however, which I have juſt now mentioned, it may not be improper to ſubject the patient, for a few days, to ſuch a diet and regimen as I have already laid down. And in order that the ſtomach and bowels may be cleanſed of any ſordes that may be lodged in them, and put into a condition to digeſt and concoct the aliment properly, a doſe of the following medicine, N° 1. will be very ſerviceable.

N° 1. ℞ Pulv. jallap.
Crem. tart. aa ℈i.
Calomel. gr. iv. *miſce fiat*
Pulv. cathart. mane ſummed. cum regimine.

The calx of antimony has uſually been added to this *formula*; but that is an inelegance, from which, for reaſons already aſſigned, I think there does not accrue the ſmalleſt advantage.

After the patient has complied with this direction for one week*, let him take another doſe of this powder, in the morning, to prepare the way for what medicines are to come afterwards; and the ſame day inoculate.

There is a variety of ways in which this operation is performed; that of juſt raiſing the ſkin with the point of a lancet, which has been dipped into a puſtule, and then rubbing the matter which adheres to it on the wound with the finger, ſeems to be as good an one as any; but if that is not convenient, a piece of thread or cotton, ſaturated with the pus, may be put into a very ſlight inciſion; and it matters not how ſmall the infection is in quantity. One would always chuſe to take it from a healthful patient, who had a very good ſort, and that before the pock had come to its full maturity, becauſe then it is poſfeſſed of leſs acrimony. Some have gone ſo far, as to take the infection from the fluid which oozes out of the wound of a patient inoculated, before he is ſeized with the fever; but that ſeems to be nothing more than a mere piece of refinement; and it is much to be doubted whether that is not more acrimonious than the other; for we ſometimes find the wounds even of thoſe who have afterwards very few ſmall pox, except juſt in thoſe parts, exceedingly foul, and very ill conditioned.

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* Which, by the bye, in my own practice I have never found neceſſary; having always inoculated him, of whatever conſtitution, the ſame day in which I began to ſubject him to a courſe of diet and medicines.

In the evening after inoculation, give a bolus of five grains of calomel. Then,

N° 2. ℞ Calc. antimon. illot. ℥iß.
Calomel. —— ʒj. *miſce fiat.*
Pulv. gr. xij. pro doſ.

Of this powder the patient is to take three doſes; one, morning, noon, and night, the day following inoculation.

To one who prepares this powder, there will, at firſt ſight, appear a chymical inelegance in the preſcription, for as ſoon as you rub the calomel with the unwaſhed calx of antimony, the powder turns firſt of a browniſh, and afterwards of a blackiſh colour; but this does not happen if you make uſe of the waſhed calx, or the nitrum ſtibiatum, or both of them conjointly, after they have been ſeparated from each other.

This ſhews, that there is a conſiderable difference between uſing the unwaſhed, and waſhed calx of antimony, even though you add nitrum ſtibiatum, or ſal polychreſt. which is pretty nearly the ſame thing, to the latter; and I have been at ſome pains to diſcover, to what this difference was owing.

At firſt, I ſuſpected that it was occaſioned by a ſmall portion of ſulphur ſtill adhering to the calx, which was not perfectly diſſipated by the deflagration. This, I imagined, converted the mercury to a blackiſh colour, but on triturating calomel with ſulphur, no ſuch effect followed. I then tried it with all the other materials, one after another, and likewiſe with them mixed together, but no ſuch effect was produced by it; but on adding a ſmall quantity of ſalt of tartar to them, the colour was ſtruck immediately. This change, therefore, is produced by the vegetable fixed alkali, contained in the nitre, which is uſed in the deflagration; which, not being perfectly ſaturated by the acid in the ſulphur, and conſequently not all converted into a nitrum vitriolatum, ſtill remains in its ſtate of alkali; and this alkali uniting with the acid contained in the calomel, gives us the brown precipitation of mercury, which is the effect here produced: therefore, by uſing the unwaſhed calx of antimony, two advantages ſeem to be gained, firſt, we by that means obtain a milder preparation of mercury, which may be uſed in a larger quantity; and ſecondly, the alkali, which is ſtill not compleatly ſaturated, acts as a conſiderable diaphoretic. But however this may be, whenever I make uſe of the waſhed inſtead of the unwaſhed calx of antimony, I always add a ſmall quantity of tartar emetic, to ſupply its deficiency in this reſpect.

On the third day, including the one on which the patient was inoculated, I give a doſe of the following pills:

N° 3. ℞ Panac. antimon, ʒſs.
Calomel. ʒj.
Bol. armen. ʒij.
Mucilag. gum. tragacanth. q. ſ.
ut fiant pil. 45.

A grown perſon is to take three of theſe pills early in the morning, and to lie in bed till he is diſturbed by them. Their ultimate effect is both to vomit and purge; but then they previouſly make the patient exceedingly ſick, which is principally intended; and that is the reaſon why we order the patient to be kept quiet in bed, for if he was ſuffered to ſtir about, they would immediately begin to exert their emetic and cathartic qualities: however, that we may more effectually ſecure to them that effect, they are made up with gum tragacanth, in order that they may diſſolve ſlowly in the ſtomach; and the benefits ariſing from this nauſea and ſickneſs, are not only that they occaſion a great flow of humours into the ſtomach and inteſtines, to be evacuated by the ſubſequent operations of vomiting and purging; but ſo great is the ſympathy between the ſtomach and other organs of the body, that all the ſecretions and excretions, eſpecially thoſe of urine and perſpiration, are greatly promoted by it.

It makes very little odds, in my opinion, whether we uſe the panacæa or the ſulph. aurat. antimon. in this preſcription, for they are nearly the ſame in their effects, only that gr. ji. of the former is a full doſe for a grown perſon, which ſhews its operation to be more violent. Nor do I expect much from the exhibition of mercury along with it, *as mercury*, any farther than as it may tend more effectually to deterge and cleanſe the primæ viæ. The Bol. Armeniac is added, with no other view, than to render the pills of a better ſize.

Theſe are all the medicines that are neceſſary to be employed in preparing for the ſmall pox, as I am fully convinced from manifold experience: however, they are often and alternately to be repeated, and at proper intervals; but it is next to impoſſible, to lay down any certain rules with regard to the frequency and quantity in which they are to be uſed; for the judgment of every one, who is the leaſt acquainted with the animal œconomy, and with the great variety which takes place in different conſtitutions, muſt tell him, that this muſt vary according to the peculiar circumſtances of every different ſubject; and a man muſt be in the habit of preparing people for the ſmall pox, for ſome time, before he will be able to adjuſt theſe matters properly.

It would not turn out to account for me to enter at preſent into a full diſcuſſion of the point, how mercury acts upon the body, that is, whether it acts by its gravity, by a ſpecific quality, or by its ſtimulus, though I confeſs myſelf inclined to be of this laſt opinion; but in whatever manner it acts, it is never neceſſary to give it in ſo large a quantity as to ſalivate. It will be ſufficient for patients to take three papers in a day, of the powder, N° 2. in doſes from gr. ij. for a child of a year old, to xij. gr. for a grown perſon, except on thoſe days when pills or a purge are to be taken, and then two in a day will be all that are requiſite; and there is a great advantage gained by thus repeating the doſe in ſmall quantities; for by that means, mercury may be taken in a much greater quantity, without ſalivating; while the other ſecretions are more effectually promoted by it.

The pills may be taken to the number of three by adults, lowering the quantity till it comes to half a one, for a child of two years old, under which age, it will not be ſafe that any of them ſhould at all be adminiſtered; but inſtead thereof, it will be proper that they ſhould take a doſe of N° 1. the cathartic powder. Theſe pills are to be repeated about the ſixth day; after which, it is expected that the gums ſhould be a little touched, juſt ſo much and no more than is ſufficient to ſhew that the mercury has found its way into the habit; and in caſe this ſhould not happen, it will be proper to give a bolus, from a grain to four grains of calomel, every evening; and the powders, N° 2. are to be continued till the coming on of the fever. But if, on the other hand, the gums are much affected, and there is a conſiderable flow of ſaliva into the mouth, give a doſe from eight to forty grains of the cathartic powder, N° 1. and if this ſhould not be ſufficient to put a check to it, a drachm or two of flores ſulphuris will do that effectually.

As children and perſons of a delicate conſtitution, have the ſmall pox, in general, much milder in the natural way, than athletic and grown perſons, ſo they likewiſe ſtand in need of proportionably leſs preparation. Children, under a year old, need do nothing more than take one or two gentle doſes of the purge, N° 1. with the powder, N° 2. every day, as directed; which laſt, has little or no ſenſible operation. But adults, of a ſtrong and robuſt habit, muſt be worked off with the pills and purges, as well as with theſe powders, pretty thoroughly.

I am in no haſte, when the fever comes on, in putting my patients to bed; on the other hand, I ſuffer them to walk about the houſe, and order the rooms to be kept cool and aired as uſual; nor do I ſuffer them to wear more clothes, nor to be covered with more when in bed than they uſed to have formerly. The firſt of my confining them to bed, is about the time when the eruption is expected; and then I give them ſmall doſes of tartar emetic, and order them to drink plentiful of wine whey to promote a ſweat; which ſeems to have this good effect, of not only carrying off the variolous matter, and of lowering the fever, but likewiſe of filling thoſe puſtules which are diſpoſed to come to ſuppuration *.

I have juſt one obſervation to add, reſpecting a ſymptom which is very apt to

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* I have likewiſe experienced the good effects of tartar emetic in the natural ſmall pox, as will appear from the following caſe.

A boy, aged ſix years, was ſeized on Saturday, the fourth of January, with a fever, which was attended with coſtiveneſs, and he vomited up every thing that was taken into his ſtomach. On Monday, the ſixth, his fever, coſtiveneſs, and inclination to vomit, ſtill continued, alarm the patient, I mean a *raſh*, which frequently happens during the eruptive fever. The whole ſurface of the body is ſometimes

when I was ſent for. As his ſtomach ſeemed to have been ſufficiently emptied, by the efforts he had made, I immediately ordered him a doſe of gently opening phyſic, which had the deſired effect of procuring him a ſtool or two; and that evening, ſmall eruptions began to appear here and there on his face and hands, but all the night he remained hot and reſtleſs. Next day, the eruptions appeared pretty plentifully all over his body; they were rather pale than red, and the fever, heat, and reſtleſſneſs ſtill continued. He was then ordered a ſaline julep, and an anodine draught to take at bed time, which moderated his fever a little for the preſent, and procured him ſome ſleep; but next day his ſkin was dry, and his heat, thirſt and reſtleſſneſs, were as great as ever. Pulſe 150. The puſtules, though they had all made their appearance, yet they did not fill, but appeared pale and flat, and ſome of them were dented with a purple ſpot in the middle. I then ordered tart. emit. gr. $\frac{1}{3}$. to be taken every three hours along with the julep. The firſt doſe made him a little ſick at ſtomach, and then immediately threw him into a gentle ſweat, which communicated itſelf equally all over his body, and it was kept up through the day by the ſucceeding doſes. At bed time, he took gr. j. with Gtt. xij. of L. L. which procured a very plentiful ſweat through the night; he reſted eaſy, the pocks began to fill, and his fever, next day, was conſiderably abated. The tartar emet. and julep were, however, repeated, by which a conſtant moiſture was preſerved on the ſkin; the fever continually grew leſs and covered with it; and ſo thick are the eruptions, that if they were all to turn out to be ſmall pox, it would be impoſſible for the patient to live under them: but inſtead of our having occaſion to be alarmed, it is moſt frequently a pretty certain ſign that the patient will have the diſeaſe very mildly. Patients, under inoculation, are more liable to it than thoſe who have the ſmall pox the natural way; but whether it is owing to the great evacuation of variolous matter through the pores of the ſkin, by which they are, as it were, fretted, or not, it is not mine to determine; but it does not happen ſo frequently when the patient is ſubjected to a cool, as to a hot regimen. It generally dies away, and peels off in a dry ſcurf, by the time that the real ſmall pox make their appearance. Finally,

What I have hear advanced, as it was the ſubject of my own obſervation, I

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and leſs, and the maturation of the puſtules went on as well as could be expected; and by continuing them for four or five days, the ſymptoms always grew milder and milder; the pock at laſt dried away, and the patient perfectly recovered.

thought it my duty, as a member of ſociety, to communicate it to the public; and there is nothing I can have more at heart in ſo doing, than to promote the welfare of my fellow creatures. The giving the ſmalleſt hint towards the mitigation of ſo deſtructive a diſeaſe, muſt certainly be doing an acceptable ſervice; but the validity of the practice I have been recommending, is confirmed, not only by my experience, but by the authority of thouſands, who have themſelves experienced the good effects of it.

I cannot, however, conclude, without finding fault with thoſe who are for laying the whole ſtreſs on only ſome of the particular circumſtances I have mentioned, for all of them are ſtrictly to be attended to. The cold regimen is undoubtedly ſerviceable, and ſo is it of uſe to pay ſome reſpect to the manner of communicating the infection; but if I were to give the preference to one thing more than another, it would certainly be to the diet and medicines; for I have inoculated the moſt athletic perſons, who had been expoſed to the ſun, had uſed much exerciſe, were juſt come from ſea, and had lived upon ſalt proviſions, without any previous preparation, and without ſubjecting them to any remarkably cool regimen; and yet, by plying them cloſely with theſe medicines, they have had the diſeaſe very mildly.

APPENDIX.

SINCE the foregoing ſheets were committed to the preſs, a very ingenious gentleman, who is well acquainted with Mr. SUTTON, and has been much converſant among his patients, brought me a quantity of the medicines which he uſes in inoculating for the ſmall pox, and which were prepared by himſelf. They conſiſt of a powder, a pill, and ſome drops; and in order to determine the nature and compoſition of them, I made the following experiments.

Of the POWDER.

EXPERIMENT I.

To a ſmall quantity of Mr. Sutton's powder, which was of a greyiſh colour, a few drops of volatile alkali were added, which immediately changed it to a deep black colour.

EXPERIMENT II.

To a ſmall quantity of the ſame, a few drops of a ſolution of ſalt of tartar were added; the colour was likewiſe changed to a deep black.

EXPERIMENT III.

To a ſmall quantity of the ſame, a few drops of lime water were added; the colour approached to that occaſioned by the former additions; but the degree of black was leſs than in experiment I. and II.

EXPERIMEMT IV.

Calomel, treated in the ſame manner, with the ſame additions, exhibited the ſame phenomena.

EXPERIMENT V.

The colour of Mr. Sutton's powder was exactly imitated, by adding a few grains of æthiops mineral to calomel, and the whole, upon the addition of vol. alkali, ſalt of tartar, and lime water, gave the ſame degree of black as in experiment I. II. III.

EXPERIMENT VI.

Neither æthiops mineral, when treated by itſelf, nor when united with a calcarious earth (crabs eyes) ſo as to give the whole a colour not unlike Mr. Sutton's powder, exhibited any ſuch appearances on the addition of either vol. alkali, ſal. tart. or quick lime.

The doſe of Mr. Sutton's powder was about xvj grs. and from its bulk, it appeared very ponderous. Grs. vj. of æthiops is ſufficient to communicate the colour to grs. x. of calomel: ſo that we may ſuſpect that quantity of it to be in the doſe.

COROLLARY.

From the above experiments, it evidently appears, that the baſis of his powder is calomel; which, though in the doſe of gr. x. may have its effects weakened by the addition of æthiops, which he uſes to colour it, it being a well-eſtabliſhed principle, that ſulphur always weakens the effect of mercury. Beſides, it has been obſerved, that in ſeveral caſes Mr. Sutton's powder has brought on ſalivation, which confirms the above.

Of the PILL.

EXPERIMENT VII.

The pilulæ cochiæ are, both in taſte and ſmell, ſo much the ſame with Mr. Sutton's pill, that the moſt accurate in theſe ſenſes could not diſtinguiſh them from one another; the bitter of the colocynth and aloes being ſtrongly marked; while the aroma of the cloves is no leſs obvious.

EXPERIMENT VIII.

Upon the ſurface of Mr. Sutton's pill, which was of a light grey colour, a few drops of a volatile alkali was poured, and it ſtruck immediately a deep black. The ſame appearances occurred upon the addition of ſalt of tartar and lime water.

EXPERIMENT IX.

Upon the addition of volatile alkali to the pilulæ cochiæ, no change of colour followed; they are naturally of a blackiſh appearance; however, when a few grains of calomel were added, they became of the ſame light grey colour with Mr. Sutton's; and upon the addition of vol. alkali, were changed into a deep black.

From theſe three laſt experiments, it appears, that Mr. Sutton's pill conſiſts of the above-mentioned purgatives mixed with calomel; and its effects prove the ſame.

Of the ACID DROPS.

EXPERIMENT X.

This acid, with which he prepares his punch, is ſo obviouſly of the ſame nature with the dulcified volatile vitriolic acid that ariſes during the diſtilation of æther, and which is the ſame with what exiſts in large quantity in the liquor Anodinus of Dr. Hoffman, that it was unneceſſary to ſubmit it to any chymical experiment.

There was nothing foreign in its compoſition.

It does not appear, from any experiments hitherto made, that the ſmalleſt quantity of antimony enters into the compoſition of Mr. Sutton's medicines. Their excellency ſeems wholly to conſiſt in the mercurial joined with the purgative. He likewiſe makes uſe of Glauber's ſalts; but for the method of giving theſe, Mr. Chandler may, with propriety, be conſulted.

The public has likewiſe lately been favoured, ſince the foregoing ſheets were committed to the preſs, with a treatiſe on this ſubject, by Dr. Dimſdale, of Hertford; whoſe extenſive practice in inoculation has enabled him to make many uſeful obſervations. Theſe he ſeems to have related with much candour; and, in the moſt diſintereſted manner, he communicated the reſult of his practice, for the good of mankind. It affords me particular pleaſure, to find that his obſervations and mine very much correſpond; and that, what reaſoning or medical philoſophy I have here advanced, is well ſupported by ſuch facts as are narrated by Dr. Dimſdale.

FINIS.

MVSEVM
BRITAN
NICVM

ERRATA.

P. 2, l. 10, for *unaerſtand*, read *have underſtood.*—P. 8, l. 18, for *ſal. polychriſt*, read *ſal. polychreſt.*—P. 19, l. 24, for *hemorrages*, read *hemorrhages.*—P. 20, l. 4, for *remiting*, read *remitting.*—P. 21, l. 8, for *runing*, read *running.*—P. 25, l. 1, for *fibers*, read *fibres.*—P. 26, l. 3, for *hemorrages*, read *hemorrhages*; l. 21, for *Lawrige*, read *Lauraguais*; l. 24, for *that that which*, read *what.* —P. 27, l. 22, dele *of.*—P. 34, l. 14, for *fibers*, read *fibres.*—P. 35, l. 22, for *Mac Bridges*, read *Macbrides.*—P. 38, l. 13, for *There*, read *But there.*